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EXAMINER	
ZERVIGON, RUDY	
ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 03/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/775,664	SHUFFLEBOTHAM ET AL.	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *72-93* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *72-93* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *3/9/2005*.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Declaration under 37 C.F.R. §1.131

1. The declaration filed on September 28, 2004 under 37 CFR 1.131 is sufficient to overcome the McMillin et al (USPat. 6,013,155) reference.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claim 72 is rejected under 35 U.S.C. 102(a) as being anticipated by Asanome, Yutaka (JP 08264518 A)[1]. Asanome teaches:

i. An inductively coupled plasma CVD processing system (Figure 1; Purpose, Constitution) comprising: a plasma processing chamber (1; Figure 1); a dielectric window (19; Figure 1; Purpose, Constitution) forming a top wall of the processing chamber (1; Figure 1); a substrate (W; Figure 1) support (9; Figure 1) adapted to support a substrate (W; Figure 1) within the processing chamber (1; Figure 1); and a plurality of injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) adapted to introduce process gas into the processing chamber (1; Figure 1), all of the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) being spaced outwardly from the periphery of the

[1] Refer to machine translation from
http://www4.ipdl.ncipi.go.jp/Tokujitu/PAJdetail.ipdl?N0000=60&N0120=01&N2001=2&N3001=H08-264518

substrate (W; Figure 1) when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1), as claimed by claim 72

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 73, 74, and 76-83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asanome, Yutaka (JP 08264518 A)[2] in view of Latz; Rudolf et al. (US 5,169,509 A). Asanome is discussed above. Asanome further teaches:

i. at least some of the injector tubes (69; Figure 1 - "nozzles"; [0040] machine translation) include an orifice (67, 71; Figure 1) orientated relative to the axis thereof to direct the process gas in an upward direction away from the substrate (W; Figure 1) when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1); and at least some of the injector tubes (65; Figure 1 - "nozzles"; [0040] machine translation) are orientated in the plasma processing chamber (1; Figure 1) to direct the process gas along axes that intersect an exposed surface of the substrate (W; Figure 1) at an acute angle when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1) - claim 73

ii. all of the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) are orientated in the plasma processing chamber (1; Figure 1) to direct the process gas along axes that intersect an exposed surface of the substrate (W; Figure 1) at an acute angle

[2] Refer to machine translation from http://www4.ipdl.ncipi.go.jp/Tokujitu/PAJdetail.ipdl?N0000=60&N0120=01&N2001=2&N3001=H08-264518

(column 7, lines 26-45) when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1) - claim 74

iii. The system (Figure 1; Purpose, Constitution) of claim 76, including a second gas ring (65; Figure 1 - "nozzles"; [0040] machine translation) disposed above or below the first gas ring (69; Figure 1) in the plasma processing chamber (1; Figure 1), as claimed by claim 77

iv. The system (Figure 1; Purpose, Constitution) of claim 72, wherein the plurality of gas flows from the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) overlap each other in a plane parallel to an exposed surface of the substrate (W; Figure 1) when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1), as claimed by claim 78

v. The system (Figure 1; Purpose, Constitution) of claim 72, wherein each of the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) includes an orifice (67, 71; Figure 1) , and each of the orifices (67, 71; Figure 1) is spaced the same distance from substrate (W; Figure 1) when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1), as claimed by claim 79

vi. The system (Figure 1; Purpose, Constitution) of claim 72, including a substantially planar electrically-conductive coil (21; Figure 1) which inductively couples RF energy into the plasma processing chamber (1; Figure 1) and energizes the process gas into a plasma state, as claimed by claim 80

vii. The system (Figure 1; Purpose, Constitution) is claim 72, wherein all of the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) have the same length (column 7; lines 24-25) such that exit orifices (67, 71; Figure 1) of the injector tubes (65, 69; Figure 1

- "nozzles"; [0040] machine translation) are spaced the same distance (column 7; lines 24-25) from the periphery of the substrate (W; Figure 1) when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1), as claimed by claim 81

viii. The system (Figure 1; Purpose, Constitution) of claim 72, wherein all of the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) are spaced outwardly from the periphery of the substrate (W; Figure 1) support (9; Figure 1), as claimed by claim 83

Asanome does not teach:

The system (Figure 1; Purpose, Constitution) of claim 72, wherein the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) are provided on a first gas ring (69; Figure 1) – claim 73

The system (Figure 1; Purpose, Constitution) of claim 72, wherein: the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) are provided on a first gas ring (69; Figure 1) – claim 74

The system (Figure 1; Purpose, Constitution) of claim 72, wherein the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) are detachably connected to a first gas ring (69; Figure 1) made of aluminum which includes outlets adapted to supply process gas into the plasma processing chamber (1; Figure 1), as claimed by claim 76

The system (Figure 1; Purpose, Constitution) of claim 72, wherein some of the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) have different lengths (column 7; lines 24-25) such that exit orifices (67, 71; Figure 1) of some of the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) are spaced a different distance from the periphery of the

substrate (W; Figure 1) when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1), as claimed by claim 82

Latz teaches a wafer plasma processing apparatus (sole figure) including injector tubes (nozzle portion of 24/24a; Sole Figure) are provided on a first gas ring (24/24(a); Sole Figure) – claim 73, 74.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Asanome's injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) with detachable Latz's injector tubes (nozzle portion of 24/24a; Sole Figure) provided on a first gas ring (24/24(a); Sole Figure), further, to optimize the dimension of Asanome's injector tubes.

Motivation to replace Asanome's injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) with detachable Latz's injector tubes (nozzle portion of 24/24a; Sole Figure) provided on a first gas ring (24/24(a); Sole Figure), further, to optimize the dimension of Asanome's injector tubes is for promoting "uniform and stable process" as taught by Latz (column 1; lines 60-65). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04). Further, it has been held that it is obvious to make whole elements seperable (In re Dulberg, 289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961) – MPEP 2144.04.

6. Claim 75 is rejected under 35 U.S.C. 103(a) as being obvious over Asanome et al (USPat. 6,013,155). Asanome is discussed above. Asanome does not teach that all of the injector tubes

(65, 69; Figure 1 - "nozzles"; [0040] machine translation) are orientated to direct the process gas in an upward direction away from an exposed surface of the substrate (W; Figure 1) when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have all of Asanome's injector tubes direct the process gas in an upward direction away from an exposed surface of the substrate.

Motivation to have all of Asanome's injector tubes direct the process gas in an upward direction away from an exposed surface of the substrate is for not blowing gas directly towards the stage as taught by Asanome (Constitution).

7. Claims 84-87, and 89-93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asanome, Yutaka (JP 08264518 A)[3] in view of Chen, Aihua (USPat. 5,691,876). Asanome is discussed above.

Asanome further teaches:

i. An inductively coupled plasma CVD processing system (Figure 1; Purpose, Constitution), comprising: a plasma processing chamber (1; Figure 1); a dielectric window (19; Figure 1; Purpose, Constitution) forming a top wall of the plasma processing chamber (1; Figure 1); a substrate (W; Figure 1) support (9; Figure 1) adapted to support a substrate (W; Figure 1) within the processing chamber (1; Figure 1), a plurality of injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) each including an orifice (67, 71; Figure 1) oriented relative to the axis thereof to direct the process gas in an upward direction away from the substrate (W; Figure 1) when the

substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1); and/or (ii) a plurality of injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) each oriented in the plasma processing chamber (1; Figure 1) to direct the process gas along an axis thereof that intersects an exposed surface of the substrate (W; Figure 1) at an acute angle when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1) - claim 85

ii. The system (Figure 1; Purpose, Constitution) of Claim 85, wherein the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) are oriented in the plasma processing chamber (1; Figure 1) to direct the process gas along axes that intersect the exposed surface of the substrate (W; Figure 1) at an acute angle (column 7, lines 26-45) when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1), as claimed by claim 89

iii. The system (Figure 1; Purpose, Constitution) of Claim 85, wherein the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) include an orifice (67, 71; Figure 1) oriented relative to the axis thereof to direct the process gas in an upward direction away from an exposed surface of the substrate (W; Figure 1) when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1), as claimed by claim 90

iv. The system (Figure 1; Purpose, Constitution) of Claim 85, wherein a plurality of gas flows from the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) overlap each other in a plane parallel to an exposed surface of the substrate (W; Figure 1)

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when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1), as claimed by claim 91

v. The system (Figure 1; Purpose, Constitution) of Claim 85, including a substantially planar electrically-conductive coil (21; Figure 1) which inductively couples RF energy into the plasma processing chamber (1; Figure 1) and energizes the process gas into a plasma state, as claimed by claim 92

vi. The system (Figure 1; Purpose, Constitution) of Claim 85, wherein each of the injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) has the same length (column 7; lines 24-25), as claimed by claim 93

Asanome does not teach:

i. the substrate (W; Figure 1) support (9; Figure 1) including means for maintaining the substrate (W; Figure 1) at a desired temperature – claim 84, 85

ii. The system (Figure 1; Purpose, Constitution) of Claim 85, wherein the means for maintaining the substrate (W; Figure 1) at a desired temperature includes an electrostatic chuck and is adapted to maintain the substrate (W; Figure 1) at a temperature ranging from about 325°C to 375°C when the substrate (W; Figure 1) is supported on the substrate (W; Figure 1) support (9; Figure 1), as claimed by claim 86

iii. The system (Figure 1; Purpose, Constitution) of Claim 85, wherein the substrate (W; Figure 1) support (9; Figure 1) includes a heat transfer gas source which is adapted to supply a heat transfer gas to control the temperature of the substrate (W; Figure 1) to a temperature of about 100°C to 400°C, as claimed by claim 87

Chen teaches:

iv. the substrate (not shown; Figure 1; column 8, lines 40-55) support (100; Figure 1) including means for maintaining the substrate (not shown; Figure 1; column 8, lines 40-55) at a desired temperature – claim 84, 85

Applicant's means for maintaining the substrate at a desired temperature is supported by the specification:

" [0027] In order to prevent damage to metal lines or the pre-existing films and structures on the substrate and to ensure accurate and precise process control, a heated mechanical or preferably an electrostatic chuck (ESC) is employed to hold the substrate. The ESC is preferably bipolar or monopolar. Preferably, the electrode is maintained at a temperature ranging from about 50°C. to 350°C, in order to maintain the temperature of the wafer to about 325°C to 375°C.

"

Consequently, Chen teaches equivalent means (column 6, lines 35-54; 5-18)

i. The system (Figure 1) of claim 72, wherein the substrate (not shown; Figure 1; column 8, lines 40-55) support (100; Figure 1) includes means (see above) for maintaining the substrate (not shown; Figure 1; column 8, lines 40-55) at a desired temperature when the substrate (not shown; Figure 1; column 8, lines 40-55) is supported on the substrate (not shown; Figure 1; column 8, lines 40-55) support (100; Figure 1), as claimed by claim 84

ii. The system (Figure 1) of Claim 85, wherein the means for maintaining the substrate (not shown; Figure 1; column 8, lines 40-55) at a desired temperature includes an electrostatic chuck and is adapted to maintain the substrate (not shown; Figure 1; column 8, lines 40-55) at a temperature ranging from about 325°C to 375°C (claim 9) when the substrate

(not shown; Figure 1; column 8, lines 40-55) is supported on the substrate (not shown; Figure 1; column 8, lines 40-55) support (100; Figure 1), as claimed by claim 86

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Asanome's support (9; Figure 1) with Chen's temperature controlled support (100; Figure 1).

Motivation to replace Asanome's support (9; Figure 1) with Chen's temperature controlled support (100; Figure 1) is for conducting high temperature processing of substrates as taught by Chen (column 1; lines 1-18; column 2; lines 18-24).

8. Claim 88 is rejected under 35 U.S.C. 103(a) as being obvious over Asanome et al (USPat. 6,013,155) and Chen, Aihua (USPat. 5,691,876) in view of Latz; Rudolf et al. (US 5,169,509 A).

Asanome and Chen are discussed above. Asanome and Chen do not teach injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) are detachably (column 6, lines 66-67) connected to a first gas ring - claim 88.

Latz teaches a wafer plasma processing apparatus (sole figure) including injector tubes (nozzle portion of 24/24a; Sole Figure) are provided on a first gas ring (24/24(a); Sole Figure) – claim 73, 74.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Asanome's injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) with detachable Latz's injector tubes (nozzle portion of 24/24a; Sole Figure) provided on a first gas ring (24/24(a); Sole Figure).

Motivation to replace Asanome's injector tubes (65, 69; Figure 1 - "nozzles"; [0040] machine translation) with detachable Latz's injector tubes (nozzle portion of 24/24a; Sole Figure)

provided on a first gas ring (24/24(a); Sole Figure) is for promoting "uniform and stable process" as taught by Latz (column 1; lines 60-65). Further it has been held that it is obvious to make whole elements seperable (In re Dulberg, 289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961) – MPEP 2144.04.

Response to Arguments

9. Applicant's arguments with respect to claims 72-93 have been considered but are moot in view of the new grounds of rejection.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.